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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/575,338  | 04/10/2006  | Toshimichi Makii     | 2003JP323           | 1811             |
| 26289 7590 07/24/2009<br>AZ ELECTRONIC MATERIALS USA CORP.<br>ATTENTION: INDUSTRIAL PROPERTY DEPT.<br>70 MEISTER AVENUE<br>SOMERVILLE, NJ 08876 |             |                      |                     |                  |
| EXAMINER  |             |                      |                     |                  |
| EOFF, ANCA  |             |                      |                     |                  |
| ART UNIT  |             | PAPER NUMBER         |                     |                  |
| 1795  |             |                      |                     |                  |
| MAIL DATE   |             | DELIVERY MODE        |                     |                  |
| 07/24/2009  |             | PAPER                |                     |                  |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/575,338

**Applicant(s)**

MAKII ET AL.

**Examiner**

ANCA EOOF

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 6, 21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 6, 21 and 22 are pending. Claims 1-5 and 7-20 have been cancelled.
2. The certified translation of the foreign priority document JP 2003-373069, filed on October 31, 2003 was received and acknowledged.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sander et al. (US Patent 4,247,611) in view of Pai et al. (US Patent 5,648,194).

With regard to claim 6, Sander et al. disclose a radiation-sensitive composition comprising:

- (a) a compound which forms an acid under the influence of actinic radiation, and
- (b) an organic polymeric compound which contains recurring acetal or ketal groupings in its main chain and whose solubility in a liquid developer is increased by the action of an acid, wherein the developer may be a weak alkaline solution (column 1, lines 55-60 and column 2, lines 3-4).

Sander et al. further disclose that this composition acts as positive-working composition (column 8, lines 22-23).

Sander et al. further disclose that the polymeric compounds (b) containing recurring acetal groups are polycondensation products containing recurring units obtained by reacting aldehydes  $R_1\text{-CHO}$  or acetals  $R_1\text{CH(OR}_7)_2$  with diols  $\text{HO-R}_3\text{-OH}$ , wherein  $R_1$  is an alkyl group with 1-12 carbon atoms,  $R_7$  is an alkyl group with 1-6 carbon atoms (column 3, lines 10-33).

Sander et al. do not specifically teach the polymer with the acetal unit of formula (I) of the instant application.

However, it would have been obvious to one of ordinary skill in the art at time of the invention to obtain such a polymer, based on Sander's teaching that an aldehyde  $R_1\text{-CHO}$  reacts with a diol  $\text{HO-R}_3\text{-OH}$  to form a polymeric structure with acetal units.

A specific example of the aldehyde  $R_1\text{-CHO}$  is n-butanal (column 3, line 54). This is equivalent to the aldehyde  $R\text{-CHO}$  of the instant application, wherein R is a propyl group.

A specific example of the diol  $\text{HO-R}_3\text{-OH}$  are polyethylene glycols with average molecular weights between 200 and 600 (column 4, lines 21-22). These compounds are equivalent to the compound of formula  $\text{HO-(C}_2\text{H}_4\text{O)}_n\text{-H}$  of the instant application, wherein n may be an integer between 4 and 10.

The polycondensation product of n-butanal and the above-mentioned polyethylene glycol will be equivalent to the unit of formula (I), wherein R is a propyl group and n is an integer from 4 to 10.

The examiner would like to point out that the specification of the instant application also teaches that a polymer comprising a unit of formula (I) may be obtained

by reacting an aldehyde  $\text{RCHO}$  or an acetal  $\text{RCH(OR')}_2$  with a polyethleneglycol of formula  $\text{HO-(C}_2\text{H}_4\text{O)}_n\text{-H}$ , wherein  $n=1-10$  (page 9, lines 2-10).

Therefore, the compound (b) of Sander et al. is equivalent to the compound (B) of the instant application.

Sander et al. further disclose that the composition may comprise a binder such as a novolak resin (column 8, lines 28-38), equivalent to the alkali-soluble novolak resin (A) of the instant application.

Sander et al. further disclose that the composition may be comprise compounds such as sulfonium salts, iodonium salts, halogen containing compounds (column 9, lines 5-11), which are equivalent to the acid generating compound (C) of the instant application, as disclosed on page 11 of the specification.

Sander et al. disclose that naphthoquinone-1,2-diazide-4-sulfochloride is preferred for use as radiation sensitive compound because, during its exposure, three acid functions are formed which give rise to a relatively high degree of intensification during splitting of polyacetals and polyketals (column 9, lines 30-34). Sander et al. further disclose that the radiation-sensitive compounds may be used as mixtures (column 9, line 5).

The naphthoquinone-1,2-diazide-4-sulfochloride is equivalent to the photosensitizing agent (D) of the instant application.

Sander et al. further disclose that other alkali-soluble resin, such as a copolymer of methyl methacrylate and methacrylic acid may be used (column 8, lines 52-54). This copolymer is equivalent to the alkali-soluble acrylic resin (E) of the instant application.

Sander et al. do not disclose that mixture of alkali-soluble resins may be used in the composition. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to use more than one alkali-soluble resin, for the same purpose.

"It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980) (citations omitted) (MPEP 2144.06 Art Recognized Equivalence for the Same Purpose)

However, Sander et al. fail to disclose that the positive resist composition may comprise a compound (F) with at least two vinyloxyalkylester groups.

Pai et al. disclose a photoresist composition comprising an alkali soluble resin, an o-naphthoquinone diazide sulfonic acid ester photoactive compound and a vinyl ether compound. The naphthoquinone diazide sulfonic acid is replaced in part with the vinyl ether composition to decrease the concentration of photoactive compound while increasing the photospeed of the composition (abstract and column 3, lines 13-17).

One of the naphthoquinone diazide sulfonic acid ester used in the composition of Pai et al. is 1,2-naphthoquinonediazide-4-sulfonic acid halide (column 4, line 11), which is equivalent to the naphthoquinone-1,2-diazide-4-sulfochloride of Sander et al.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a vinyl ether in the composition of Sander et al., as taught by Pai et al., in order to decrease the amount of naphthoquinone-1,2-diazide-4-sulfochloride needed for the composition, while maintaining the image resolution and increasing the photospeed (Pai et al., column 3, lines 13-17).

Pai et al. further disclose that the vinyl ether compound may be bis(4-vinyloxybutyl)isophthalate, bis(4-vinyloxymethylcyclohexylmethyl)glutarate and bis(4-vinyloxybutyl)succinate (column 4, lines 63-65). These compounds are equivalent to the compound (F) with at least two vinyloxyalkylester groups of the instant application.

Sander et al. disclose that the alkali-soluble resin may be comprised in the composition in an amount of 30-90 % by weight based on the solid content (column 8, lines 54-57).

The alkali-soluble acrylic resin should be comprised in an amount up to 20 percent by weight of the alkali-soluble resin (column 8, lines 65-66). If the acrylic resin represents 20% by weight of the alkali-soluble resin and the novolak resin represents 80% by weight, the ratio novolak resin : acrylic resin is 100:25, which is within the range of novolak resin (A): acrylic resin (E) of the instant application.

Sander et al. further disclose that the radiation sensitive compounds may be used in an amount of 0.1-10 % by weight based on the total weight of the solids (column 10, lines 14-17). Therefore the ratio of novolak resin : naphthoquinone-1,2-diazide-4-sulfochloride is 100: 0.033 to 11.11, which is in the range alkali soluble resin (A) : photosensitizing agent (D) of the instant application. Also, the ratio of novolak resin : acid generator is 100: 0.033 to 11.11, which is in the range alkali soluble resin (A) : acid generator (C) of the instant application.

Sander et al. teach a composition wherein the polymer with acetal units is comprised in an amount of 29 parts per 100 parts of alkali-soluble novolak resin (see

Example 1 in column 20, lines 15-31). This value is within the range of novolak resin (A): polymer with acetal groups (B) of the instant application.

Pai et al. teach a composition comprising a novolak resin and a vinyl ether in a ratio of 100:16.66 (see column 6, lines 45-53), which is within the range of the instant application of novolak resin (A): component (F).

With regard to claim 21, Sander et al. teach that a copolymer of methyl methacrylate and methacrylic acid may be used as alkali-soluble resin (column 8, lines 50-54). Such copolymer is equivalent to the alkali-soluble acrylic resin containing a structural unit of an alkylmethacrylate and a structural unit of methacrylic acid of the instant application.

5. Claims 6 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sander et al. (US Patent 4,247,611) in view of Pai et al. (US Patent 5,648,194) as applied to claim 6 and in further view of Hatanaka et al. (WO 03/087941, wherein the citations are from the English equivalent document US Pg-Pub 2005/0147914).

With regard to claim 22, Sander modified by Pai teach the composition of claim 6 (see paragraph 4 above). Sander et al. further teach that a copolymer of methyl methacrylate and methacrylic acid may be used as alkali-soluble resin (column 8, lines 50-54) but fail to teach a copolymer of a hydroxyalkylmethacrylate and an alkylmethacrylate.

Hatanaka et al. disclose a positive resist composition comprising an alkali-soluble resin (abstract), wherein the alkali-soluble resin may comprise a



hydroxyethylmethacrylate unit and a methyl methacrylate unit (par.0059, par.0075). A positive resist comprising such copolymer leads to a pattern with good properties (par.0077).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a copolymer comprising a hydroxyethylmethacrylate unit and a methyl methacrylate unit, as taught by Hatanaka et al., as alkali-soluble resin in the composition of Sander et al., with a reasonable expectation of success.

A copolymer comprising a hydroxyethylmethacrylate unit and a methyl methacrylate unit is equivalent to the acrylic resin (E) of the instant application.

### ***Response to Arguments***

6. With regard to the applicant's arguments, see page 5 of the Remarks filed on May29, 2009, the examiner would like to not the following:

- The rejection of claims 18-20 under 35 U.S.C. 112, second paragraph is moot following the cancellation of claims 18-20.

- The rejection of claims 5 and 19 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-2 of U.S. Patent No. 7,255,972 in view of Sander et al. (US Patent 4,247,611) is moot following the cancellation of claims 5 and 19.

- The rejection of claims 1 and 18 under 35 U.S.C. 103(a) over Sander et al. (US Patent 4,247,611) is moot following the cancellation of claims 1 and 18

- The rejection of claims 5 and 19 under 35 U.S.C. 103(a) over Sander et al. (US Patent 4,247,611) in view of Hatanaka et al. (WO 03/087941, wherein the citations are from the English equivalent document US Pg-Pub 2005/0147914) is moot following the cancellation of claims 5 and 19.

- The rejection of claim 14 under 35 U.S.C. 103(a) over Sander et al. (US Patent 4,247,611) as applied to claim 1 and in further view of Pai et al. (US Patent 5,648,194) is moot following the cancellation of claim 14.

- The rejection of claim 15 under 35 U.S.C. 103(a) over Sander et al. (US Patent 4,247,611) in view of Hatanaka et al. (WO 03/087941, wherein the citations are from the English equivalent document US Pg-Pub 2005/0147914) as applied to claim 5 and in further view of Pai et al. (US Patent 5,648,194) is moot following the cancellation of claim 15.

- The rejection of claim 20 under 35 U.S.C. 103(a) over Sander et al. (US Patent 4,247,611) in view of Pai et al. (US Patent 5,648,194) is moot following the cancellation of claim 20.

7. Applicant's arguments with respect to claims 6, 21 and 22, see page 6 of the Remarks, have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. E./

Examiner, Art Unit 1795

/Cynthia H Kelly/

Supervisory Patent Examiner, Art Unit 1795+